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A Border of Hardy Perennials.

A SUGGESTIVE letter on this subject will be found in our correspondence column this week—a letter which touches upon many interesting subjects, to some of which we shall make reference in future issues. It is true that no part of the flower-garden is quite as attractive as that which is devoted to hardy herbaceous perennials, and these plants are invested with a charm of their own which other plants and other classes of plants do not possess. A garden is never quite as satisfactory at any other time of year as it is in the spring, and all the flowers in a spring garden are those of such sturdy constitution that they can endure the cold of our winters, while a large portion of them live on and flower again the next spring, and, indeed, for a long succession of springs. Perennials which bloom at other seasons, besides their intrinsic beauty, also command a certain respect for their ability to live on and flower with increasing vigor year after year without any annual preparation of the ground and sowing of the seed. Many of them are better for cutting and for other uses than are annuals or the tender species which have to be housed every year, and they can be used in an infinite number of ways for the decoration of gardens small and large.

But every plant, as well as every class of plants, has its limitations, and there are some purposes to which hardy perennials are not adapted. Interesting as they are individually, it is impossible to fill a large border with a selection of these plants alone which shall be constantly in bloom and be disposed in such a way that the flowers shall at all times present a picture of harmonious form and color. If the bed presents a certain scheme of color in early spring, and a succession could be arranged so that as one blue flower fades another flower of the same color would be ready to take up its work, and the same scheme could be carried out with yellow flowers and those of other shades, the same colors and the same arrangement of colors would be maintained the season through, and the picture would become as tiresome and monotonous as a pattern bed of Coleus. Fortunately, this is not possible. Very plainly, too, as the colors of each portion of the bed vary from week to week, some flowers lasting for a few days and others perhaps as many weeks, the problem of adjusting these shifting colors so that they will constantly arrange themselves into new and equally harmonious combinations becomes too intricate for any practical solution. It is not difficult to construct a single picture for any given season, but when its elements are constantly changing, so that one picture passes fluently into quite a different one, it would baffle any skill to have all these transformations equally beautiful and developing into new and rich harmonies of color during all the flowering period.

But, even if we could figure out the necessary permutations and combinations for such a result, we should still fail of our continuous picture, because it is impossible to keep a perennial border filled with plants in flower. It is very true, for example, that when the tops of some of the bulbous plants die down and become unsightly we may arrange to have their places filled with other flowering plants without much or any detriment to the strength of the bulbs for another year. But this only provides for a second period of bloom, and by no means for the entire season. There are many other perennials, as, for example, our beautiful Mertensia Virginica, which flowers in early spring and soon dies completely out of sight, and we may have planted near it the blue Plumbago, Ceratostigma plumbaginoides, which hardly appears above the ground until the Lungwort has disappeared, and which will bloom from midsummer until frost. But, of course, there will be a period between the flowering of these two plants when the space which they occupy will show no flowers. The only possible way of keeping a border filled with flowers is to have reserve supplies of annuals and other plants to take up and put in their places when their flowering season is done. We may sow the seeds of such annuals as Shirley Poppies or Centaurea in the autumn among our Narcissus-bulbs, and these will flower as the tops perish. But after they are gone the space can only be occupied by plants which have been grown elsewhere for this purpose. But, again, there are a great many perennials which do not entirely die away. Some of them will have unsightly fruit, and the dead stalks which bear them can be cut away, but there will be a mass of foliage which must live through the summer to store up food in the stout roots which are to produce the next spring's flowers. Some of them die completely down in midsummer, like the Ascension Lily, but these may soon throw out leaves to build up bulbs again, and remain green all winter. Of course, the late-flowering species must occupy the ground all summer, so that, altogether, while it is a practicable matter to have hardy herbaceous perennial plants flowering in abundance at all seasons, from early spring till frost, it is not possible to make a bed out of them exclusively which, for general effect shall be satisfactory the season through.

But this only means that there is one use to which hardy perennial flowering plants are not quite adapted. They are valuable in so many other directions, however, that there is little danger that any horticultural writer will say too much about them. We agree with our correspondent that in describing them, as well, indeed, as in describing every other plant, their defects, as well as their beauties, should be pointed out, and that an explanation of the peculiar habits and characters, the likes and dislikes of each individual, so far as it is possible, should always be fully set forth. Mere lists of plants, or skeleton descriptions which place each one of a long series of plants in the same plane without any perspective, are really of no use to the novice. It has been our custom rather to give full details of the character and habits of a few plants in each issue of this journal, than to spin out a catalogue which is little more than a list of names. Readers who begin to take an interest in any plant will find it a good exercise to examine the back volumes of GARDEN AND FOREST, which is not a difficult thing owing to the careful index which we have made every year. All the perennial plants which are essen-

tial to hardy gardens in eastern America have more than once been pretty fully noticed in one way or another, and yet we shall be very glad to continue this work and make it even more systematic in the future.

Of course, there are many items of knowledge which no text-book can convey. The plant which is picturesque and attractive in one position will be a weed in another, and this can only be learned by personal and familiar acquaintance. Fortunately, it is one of the keenest delights of horticulture to make such acquaintance with plants. No doubt, the manuals and journals can all improve upon their methods of instruction, and we shall always welcome suggestions in this direction; we shall take pleasure also in answering specific questions about specific subjects. But, after all, the keenest satisfaction does not come from reading what some one else has learned, but from actual and practical experience in the garden. After all is told about a plant and its habits a careful and sympathetic grower will find that it develops under his hands characteristics of which he had never dreamed—that is, it will never cease to be an object of interest, a result certain to happen just as soon as he knew it completely. It is the perennial delight of horticulture, and the special delight of the perennial garden, that it constantly offers a field for study and for research; that it has something new to unfold every day; that old plants are constantly developing new beauties, and that new ones are constantly disappointing or surprising. In short, a garden continues to be always attractive because it is never finished. It will be enriched with memories of success and failure every season; but, after all, its fresh and hopeful promise for the future will never fail, but will stimulate an ever-renewed and ever-deepening interest as the years move on.

Some Trees at Rancho Chico.

A GREAT many prominent persons remember with pleasure the hospitality of Rancho Chico, in Butte County, California, but the place is especially dear to botanists. There the Sir Joseph Hooker Oak stands; there the late Dr. C. C. Parry spent many vacations, and the late Asa Gray, John Muir, the mountaineer, and many others have studied and admired that magnificent estate of 26,000 acres of valley and foot-hill.

Much of the ranch is still in forest—the primeval Oak forest of the Sacramento valley. Along Rio Linda and Chico Creek are thousands of the finest Sycamores in California, often draped to their summits with the wild Grapevine. The range of native vegetation is very extensive, and no species has been allowed to be destroyed. There is a wild garden of many acres, unpastured and unmowed these fifty years.

But the grounds about the mansion alone afford sufficient material for more than one article. Here, General Bidwell, the owner of Rancho Chico, began to plant native and exotic trees as early as 1856 in what was then a great unfenced cattle range, on the north side of Chico Creek. Some earlier efforts to move young Conifers from the Sierras had utterly failed, when a Scotch gardener, named Carmichael, offered to transplant specimens of native California trees to the place.

He brought down about a hundred selected specimens of Pines, Firs and other Conifers; of Mountain Oaks, of Ceanothuses, Manzanitas and various shrubs. Every one grew, and some of the Pines thus planted in 1856 are now a hundred feet high, with trunks three and a half feet in diameter. The bulk of the ornamental planting, however, was not done until about 1868, and, except where otherwise noted, the trees hereafter named are twenty-five or twenty-six years old. In the first rank of notable trees is the famous Rancho Chico Fig, which stands on the lawn east of the mansion. It was illustrated several years ago in *The Century Magazine*, but it is larger and more picturesque now. The variety is the old Mission, known as Black California, an immense bearer, not as hardy as some varieties, but in favorable situations one of the strongest growers known. Spreading out from a central crown the tree has sent out vast boughs that have rooted somewhat after the fashion of an Indian Banyan, and so extended themselves. It still keeps the appearance of a single tree, however—a broad, low tree, fifty feet high, with boughs that cover a circle nearly a hundred feet across.

Two specimens of Quercus Robur merit attention. They are very shapely, with clear trunks twenty inches in diameter, and are, perhaps, forty-five feet high. A Quercus Cerris of about the same age and size is heavily loaded with acorns. Quercus aquatica and other American species have evidently found a most congenial home here.

Everywhere one notes with pleasure the free use made of American trees and shrubs. Among many trees Juglans Californica, one fine specimen, girths twelve feet, and is about seventy-five feet high. The Catalpas are very large, probably unsurpassed in California. Pecans and Hickories, sixty feet high, are in full bearing. Sequoias (S. gigantea), eighty feet high, stand with equally choice specimens of Pinus ponderosa, Pseudotsuga taxifolia, Cupressus Lawsoniana, the giant Thuya, the Libocedrus and many other notable trees. Still older Sycamores, Oaks (Quercus lobata) and one giant Cottonwood (Populus Fremontii) stand on the sloping banks of the stream, as they stood while California was an obscure Mexican province. The Cottonwood is one of the great trees, a hundred feet high and sixteen feet in circumference of trunk. It stands at a bend of the stream, where its flowering season causes little or no annoyance, and at all other times it is a grand spectacle of semi-tropic luxuriance.

Here are American Elms that would not disgrace New England, and superb evergreen Magnolias, seventy feet high, and Olives whose trunks are mossed and ridged till they seem century-old trees. But there is no more remarkable tree on the grounds than the one specimen of Flame-tree (Brachychiton diversiloba). This, I feel confident, is unique in its way. General Bidwell obtained a small tree of this beautiful species some thirty years ago. It grew rapidly and blossomed, but a very severe winter killed it to the ground eight or nine years ago; a sprout came up, and it is now a straight and lovely shaft of smooth silken green, crowned with the charmingly diversified foliage so characteristic of the species.

Among other species that are not American one observes a fine Ginkgo biloba, perhaps thirty-five feet high; a Camphor-tree, about sixty-five feet high; a tall Cedrus deorara, a most beautiful specimen of Thuya gracilis pendula, fully seventy feet high; a very large Cryptomeria Japonica; a Tamarix, whose trunk is eighteen inches in diameter, and a Chamærops excelsa, whose crown is well up among the older trees of the garden.

The collection contains some particularly fine Lauruses—an L. Chinensis, twenty-six feet high and eighteen feet across, the branches extending downward to the ground; also equally good specimens of L. Cerris and L. Japonica. Then, too, one notes such distinctive American shrubs and small trees as Ceanothus cuneatus, Heteromeles arbutifolia and several of the Manzanitas. The beautiful pink-flowered Acacia of Constantinople, Albizzia Julibrissin, leans over the bridge by the entrance to the grounds.

The list might easily be made twice as long. Even as it is, I have not described the superb Chestnuts, the American Persimmons, the Cherry-trees, that are among the largest in California, and many other notable specimens that attract little attention here, where they seem lost in the multitude. Sufficient has, perhaps, been said, however, to draw the attention of students to this collection, the finest in northern California. It only remains to be added that the grounds are freely open to the public every day, except Sunday, and will amply repay a visit. Severe thinning is now necessary to preserve the shape of the finer specimens, but if this is properly done these grounds will long increase in botanical and historic importance.

Berkeley, Calif. *Charles Howard Shinn.*

Foreign Correspondence.

The Herbaceous Border.

AMERICAN horticulturists will probably be interested to hear something of this comparatively recent development in English gardening, and which has grown to be one of the most popular of the many summer attractions at Kew. Kew has some exceptional advantages for this kind of gardening—namely, sufficient space to devote to each kind of plant used for its most effective display—and what is, perhaps, most important of all, an enormous collection of hardy perennial and annual herbaceous plants to select from. The border is at its best from about the latter half of July till the frost comes in October or November.

A few words descriptive of the border may perhaps be useful. It is a wide strip of richly manured soil about sixty yards long and twenty feet wide, backed on the east side with a long range of greenhouses, and in front a fine carpet-like stretch of lawn. The border is unshaded by trees and well beyond the reach of any tree-roots. The greater portion of it is given up entirely to showy herbaceous plants, but, to give variety and furnish the border in winter, groups of shrubs, such as Roses, Genistas, Olearia Haastii, Golden Privet, Laurestinus, shrubby Spiræas, Aucubas, etc., are planted at irregular intervals. These not only furnish the border in winter, but they also add considerably to its floral attractions in summer.

Two years ago the border was trenched and heavily manured During dry weather it is watered with the hose. Many of the herbaceous perennials, such as the Sunflowers, Althæas, Liliums, Pinks, Phloxes, etc., are left permanently in the borders, but even these are best lifted in early spring and replanted in freshly turned soil.

As an object-lesson for the amateur, and, I think I may add, for many professional horticulturists also, this big collection of showy herbaceous plants has a special value at Kew. Everything is, of course, labeled, so that the visitor can make a selection to meet his own requirements and take down the names of his choice, with a view to procuring them from the nurserymen next year. And it is surprising how many avail themselves of the opportunity thus afforded. Most people desire to grow some flowers, but they are often at a loss to know what will grow, when it will flower and the size it attains under ordinary treatment. As I have said, Kew has exceptional facilities for showing what is good among the newer introductions, and, at the same time, keeping the old favorites from going to the wall. I have made a list of the most attractive of the plants in this border in the latter part of July, grading them according to their heights in three sets, namely, front row plants, middle row and back row. All these plants are in full flower now, and many of them will continue in flower for some weeks longer. At Kew each plant is represented by a large effective group or mass, the smallest plants covering a square yard or more, and the largest five or six times that space. I give the list in the hope that it will prove of some guidance to any one wishing to make a border of the kind described. At the same time I can strongly recommend such a border to all who desire to have a feature of ever-changing interest and beauty, in which respect it is superior to the mixed shrubbery, the ordinary flower-garden, or even the rosery itself. At the same time, it is easily managed by any one who has a little knowledge of outdoor gardening.

Back row—plants five feet or more in height when in flower:

Delphiniums, Hollyhocks—single and double, Bocconia cordata, Lathyrus latifolius, L. rotundifolius, Sweet Peas, Tropæolum majus, Dahlias, Foxgloves, Polygonum polymorphum, Althæa ficifolia, Senecio macrophylla, Mischanthus Sinensis and M. Japonicus (generally called Eulalias), Sunflowers—perennial and annual, Lilium testaceum, L. auratum, L. pardalinum, L. superbum.

Middle row—plants from two to four feet in height when in flower:

Phloxes, Monarda didyma, Lychnis splendens, L. Chalcedonica, Pyrethrums, Campanula persicifolia, C. rapunculoides, Polemonium Richardsoni, Papaver orientale, Potentilla argyrophylla, Lavatera trimestris, Lilium umbellatum, L. longiflorum, L. candidum, Centaurea Cyanus, Hemerocallis, Gladiolus, including C. Colvillei and its variety alba, Anemone Japonica, Amaranthus caudatus, Calliopsis elegans, C. atrosanguinea, Aconitums, Chrysanthemum maximum, Coreopsis grandiflora, Achillea Millefolium, Helenium pumilum, Erigeron speciosus and the variety superbus, Lythrum Salicaria, Centranthus ruber, Scabiosa Caucasica, Eryngium giganteum, E. alpinum, E. Oliverianum, Gypsophila paniculata.

Front row—plants less than two feet in height when in flower:

Stocks, Marigolds, Pentstemons, Carnations, Pinks, Violas, Calceolarias, Geum miniatum, Linaria delphinioides. Clarkias, Sweet Alyssum, Iberis umbellata, Ageratum, Heliotrope, Antirrhinums, Godetias, Phacelia campanuloides, Calliopsis Drummondii, Eschscholtzia Californica, Convolvulus minor, Viscaria oculata, V. cardinalis, Centranthus macrosiphon, Linium grandiflorum, Acroclinium roseum, Tropæolum Vesuvius, Campanula Carpathica, Dimorphotheca annua.

London. *W. Watson.*

Plant Notes.

STATICE LATIFOLIA.—Just now this plant is invaluable for furnishing that misty halo which gives the touch of completeness to a bouquet of bright flowers. Gypsophila paniculata has served this purpose for a month with its minute white flowers, borne in open panicles and on almost invisible stems, but this is now past blooming. One of our native plants, Euphorbia corollata, with its large, open double-forked umbels of white petal-like involucres, is almost as good. Some of the Galiums, especially G. aristatum and G. hexaphyllum, serve the same purpose, and, indeed, no hardy border should be without all of these plants, for they are invaluable to associate with cut flowers. None of them, however, is better than the Statice, which, unlike the others, bears flowers of a clear blue, but they are so minute that they hardly do more than give a hazy suggestion of their color. This plant is perfectly hardy, and it flowers every year and remains in bloom a long time.

NELUMBO LUTEA.—The Water Chinquapin, which is the common name in the south-west for this native plant, has always been rare in the middle states A colony of the plants has existed in Swartswood Lake, Sussex County, New Jersey, ever since the settlement of that state, and they are still found there in great abundance, in spite of their wholesale destruction by summer visitors. This year, it is said, they bloomed earlier than usual and a correspondent writes that they are deteriorating in size. Ten years ago leaves from two and a half to three feet across were not rare, and now the average size of the leaf is less than two feet. A reason suggested for this by our correspondent is that the largest flowers are always carried away before they perfect seeds, and that the new seedlings must therefore come from inferior flowers, so that the result is the survival of the smallest. Perhaps it is more probable that the plants are gradually exhausting the soil. This Nelumbo is quite as handsome in its way as the so-called Sacred Lotus, N. speciosa, which is now much more common in gardens than the native plant. It is said to be a little more difficult to cultivate than the East Indian plant, although skillful growers find no difficulty in establishing it. The round leaves are usually held above the water by the stout stem attached to them in the centre, and the pale lemon-yellow flowers are six to ten inches across, and in exceptional cases still larger.

MONARDA DIDYMA.—This is one of our native herbaceous perennial plants which has never been used in the hardy

flower-garden as extensively as its merits warrant. In different parts of the country it is known variously as Crimson Balm, Oswego Tea, Bee Balm, and sometimes Crimson Bergamot. It is not generally abundant, although it is a very familiar wild flower in some parts of West Virginia, where in damp shady ground and on the margins of small streams it often covers areas of considerable extent. Its glowing color and mint-like fragrance make it interesting anywhere, and with good cultivation it will grow much taller than it does in its native home. It ordinarily attains a height of some two feet in its wild state, but it grows more than twice as tall when well cared for, and its conspicuous scarlet heads continue to appear in succession for a long time. Occasionally wild plants are found with pure purple flowers, which are hardly less striking than the crimson form, and well deserve to be perpetuated in gardens. Mr. Jackson Dawson writes that a bed of this plant, some ten feet square, which he recently saw on the grounds of Mr. N. T. Kidder, Milton, Massachusetts, was quite as interesting as anything else in Mr. Kidder's very large collection of hardy herbaceous perennials. Other native species of the Horse Mint, like M. fistulosa, with purple flowers, and M. punctata, with bracts tinged yellow and purple, also make desirable garden-plants.

Tamarix Indica.—This shrub is much more desirable than those belonging to that section of the genus which bloom in the spring on wood made the year before. The late-flowering type has just come into bloom in this latitude, and plants which have been cut hard back every year after flowering throw up slender flexible branches six feet in length and more, making a mass of delicate fern-like foliage, and bearing at the summit of each branch great masses of light pink flowers. Nothing can be more exquisitely graceful than the entire habit of this plant, and it is especially attractive in early morning now, when its branches droop under the weight of silvery dew. The Tamarisks are all good seaside shrubs, as they endure salt spray well.

Viburnum Lantana.—We have more than once called attention to the value of the European Wayfaring-tree as an ornamental plant in this country, where it grows more satisfactorily than many other European trees and shrubs. It is a tall, shapely, many-branched shrub, with attractive healthy foliage and dense clusters of white flowers, which open here earlier in the spring than those of any other Viburnum except V. lantanoides, the American Hobble-bush, one of the most difficult of all American plants to establish in gardens. The flowers of the Wayfaring-tree are followed by the handsome oblong fruits borne in dense compact clusters, which in the autumn turn blue-black, but just now are bright vermilion-red and exceedingly handsome and showy. It is this midsummer color of the fruit of the Wayfaring-tree which makes it most valuable as an ornamental plant here, as it is most showy at the season of the year when few shrubs are in bloom and before the fruits of most of them have assumed bright autumnal colors, and at a season, therefore, when bright colors in the shrubbery are most in demand and most valued.

Vitex Agnus-castus.—In our issue last week Mrs. Danske Dandridge spoke of this plant as having bluish purple flowers, but we have received three flower-bearing branches from Mr. Joseph Meehan, each of which bears flowers of quite distinct colors. The one most common is a pale lilac; another is a clear white, with perhaps a tint of lavender, while the third is a true blue. This last is doubtless the most showy of all and the most desirable, since blue flowering shrubs are rare at any season. Unfortunately, this Chaste-tree, which is a native of the country around the Mediterranean, is not hardy much north of Philadelphia, but Vitex incisa, a native of northern China, has proved comparatively hardy in the Arnold Arboretum. The stems are killed back in the severest winters, but since the spike-like clusters of blue flowers appear on the new wood, the slight winter-killing does not interfere with the flowering of this really desirable plant, which is a tall shrub or small tree.

New or Little-known Plants.

Cereus Pecten-aboriginum.

No more strange or remarkable plants can be found in any part of the world than the great arborescent Cacti of the deserts of Sonora, the neighboring borders of Arizona and Lower California. Three of these Sonora giants are known, and a fourth arborescent Cactus inhabits the arid region of the Peruvian lowlands.

The tallest of these plants is the Suwarro, or Cereus giganteus, which dots in countless thousands the low, rolling, stony foot-hills and mesas of southern Arizona with its tall columnar shafts, and is now familiar to travelers on the line of the Southern Pacific Railroad, who see it in perfection near the ancient city of Tucson. The fruit of this remarkable tree, which sometimes grows to the height of sixty feet, is dried and eaten by the Arizona Indians and half-breeds, who also press them to obtain their thick molasses-like juice, which they preserve for winter use. The stout woody ribs which form the trunk, and which practically never decay, furnish rafters for the adobe houses of southern Arizona and fencing for Arizona gardens.

The second species, Cereus Thurberi, the largest, although not the tallest, of the group, which sometimes forms forests of considerable extent, has already been described and figured in this journal (vol. ii., p. 64, fig. 93). The third species, Cereus Pecten-aboriginum, is less known than the others, and we are glad of the opportunity to publish in this issue (see page 335) an illustration of this plant made from a photograph taken by its discoverer, Dr. Edward Palmer, whose indefatigable explorations of the Mexican flora have brought to light many interesting and undescribed plants

Cereus Pecten-aboriginum* is a tree twenty to thirty feet in height, with a trunk a foot or more in diameter, dividing into numerous erect ten or eleven ribbed branches armed with stout, straight, ash-colored spines tipped with black. The flowers, which are produced at the top of the branches, are two or three inches long, with purple succulent sepals, fleshy white petals and a hirsute ovary. The fruit is dry and globose, two and a half to three inches in diameter and covered with "pulvinate densely hairy areolæ, which are for the most part beset with stiff setaceous unequal yellowish spines."

The Indians of Sonora grind the seeds (as they do those of many other species of Cactus) and mix them with their meal, and use the bristly covering of the fruit as hair-brushes.

The existence of this species was first made known by Dr. Palmer's discovery in 1869 of these brushes in the hands of the Papago Indians at Hermosillo, in Sonora, although it was not until 1868 that he found the plant that had produced them. So far as we have been able to learn, this interesting plant is not in cultivation, although Mr. Watson, the author of the species, suggested that it may be identical with the Cereus macrogonus of Salm-Dyck, of unknown origin, which has been in gardens since before 1850.

Cultural Department.

Some Raspberry Crosses.

During the summer of 1890 I spent considerable time in hybridizing Raspberries. As the result of this work there are quite a number of plants of bearing age now growing on the grounds of the horticultural department of Cornell University. The following brief account will serve to give a general idea of their character:

Gregg × Shaffer (Rubus occidentalis × neglectus): Five plants from seeds of the Gregg fertilized with pollen of the Shaffer are now growing and fruiting. Four of them resemble the Gregg in character of plant, and one approaches the Shaffer more closely. In character of fruit-cluster three are more or less elongated like Shaffer, and two are aggregated like the Gregg. The fruit varies in character between that of

* Watson, *Proc. Am. Acad.*, xxi., 429 (1886).—Brandegee, *Proc. Cal. Acad.*, ser. 2, iii., 141.—Vasey & Rose, *Contrib. U. S. Nat. Herb.*, i., 39.—Sargent, *Silva*, ii., 52.

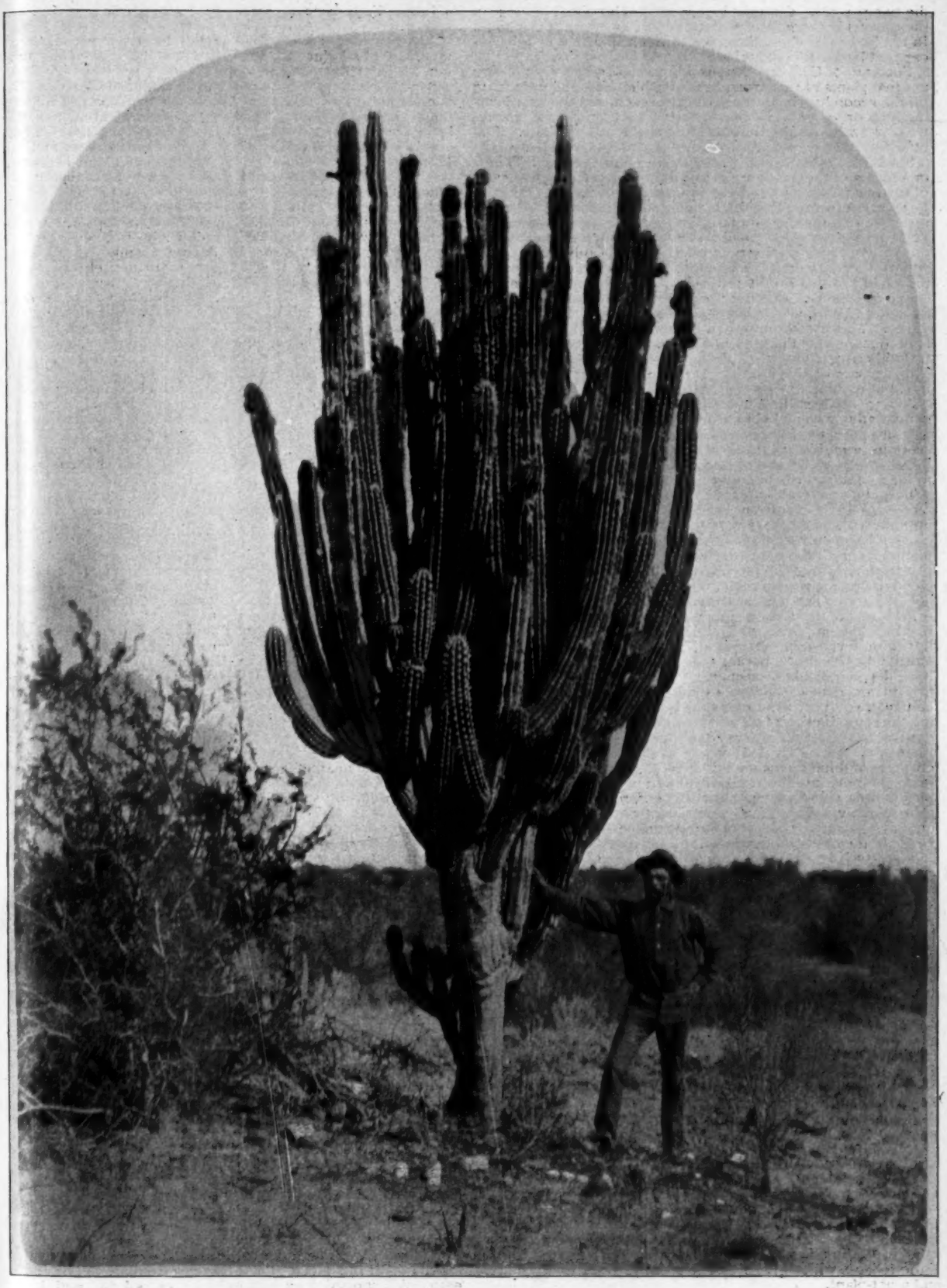

Fig. 54.—Cereus Pecten-aboriginum, in Sonora.—See page 334.

the two parents. On one plant it resembles the Shaffer; on the other it is more nearly intermediate, or nearer the Gregg. In the darkest of them the color is much like that of a black-cap just before it is fully ripe.

Fontenay × Cuthbert (Rubus Idæus × R. strigosus): There are five plants of this cross, four of which did not germinate till the second spring after sowing the seed, and they are bearing little or no fruit. Three resemble the Fontenay in character of growth, one the Cuthbert, and one is intermediate. The little fruit thus far produced shows no particular value.

Shaffer × Cuthbert (Rubus neglectus × R. strigosus): Thirty-one plants of this cross are growing, combining the characters of the two parents in various intermediate stages. The ma jority seem to resemble the male parent in character of plant and method of propagation. Of those which germinated the first spring after sowing and are now fruiting well, some produce typical red Raspberry fruits as light as Cuthbert in color, while others are dark like Shaffer. One in particular bears a promising large, bright red berry, resembling Cuthbert in shape and flavor. Another productive plant bears a medium-sized dark berry, which has an unusually rich and agreeable flavor. The greater number, however, have not produced fruit to any extent the present season.

Cuthbert × Shaffer (Rubus strigosus × R. neglectus): Three plants of this cross show various intermediate characters, but nothing of especial interest at present.

Ada × Cuthbert (Rubus occidentalis × R. strigosus): Three comparatively weak hybrids, the offspring of the above parentage, are growing, but none of them are yet bearing fruit. All seem to resemble the male more than the female parent in the character of the canes. As yet they show no indication as to the manner in which they will propagate.

The above are all crosses between different species, if we recognize Rubus neglectus as a species. At least, the types are different, whether we regard them as species or not. Of crosses between varieties of the same species there are three plants from Cuthbert pollenized with Turner, and seven plants of Turner × Cuthbert. None of them are bearing sufficiently to indicate their value, but they show the same general law of intermediate gradations as the others.

Perhaps the most interesting point in connection with these results is the emphasis which they give to the value of breeding for a purpose in the case of plants as well as of animals. Horticulturists, more, perhaps, than any other class of people, have depended chiefly on chance to aid them in their progress toward an ideal excellence of the various fruits which they cultivate, yet there is no necessity for this. The laws governing the reproduction of plants are no more intricate than those governing the reproduction of animals, if, indeed, they are not the same. There is nothing new in the discovery that plant-crosses combine the characters of both parents in various degrees, and that nothing radically different need be expected, but it needs constant repetition and enforcement. With this principle in view, systematic, persistent effort to combine the qualities desired ought soon to give us varieties quite in advance of the ones we now have.

University of Nebraska. *Fred W. Card.*

Cannas.

NOTING the improvements in Cannas several years ago, a friend of mine gave it as his opinion that we should soon have varieties with flowers as large as those of the Gladiolus. That stage was past when Madame Crozy was introduced, some three years ago. This variety has been the standard by which all subsequent varieties of its color have been judged. When looking at a large bed containing some three hundred plants of Madame Crozy recently at the University garden, Cambridge, it was hard to imagine how this can be excelled. The dwarf, erect, free-flowering habit of this variety, with its large spikes of scarlet flowers, bring it close to absolute perfection.

Going to Claredon Hills, Boston, the home of Mr. James Farquhar, I was astonished to see some of Crozy's latest productions, which, by special favor, Mr. Farquhar was allowed to select while in France last summer, some of which exceed even Madame Crozy in brilliancy of tone and finish. Most meritorious among these are:

Baron M. D. Hirsch: Flowers large, but brighter than the type, with a very narrow, but clearly defined, yellow edge.

Paola Radaelli: Deep crimson flowers and bright yellow edge.

Antoine Crozy: More erect flowers.

C. H. Morlin: Large, compact, vermilion spike and handsome foliage, which give it great promise both as a bedder and a pot-plant.

James Farquhar: Flowers striped as well as bordered with yellow.

Van dem Berg: With considerably larger flowers than the type, and of a lighter shade of scarlet, and a wide yellow margin. It is a strong dwarf grower.

Among some of the Crozy seedlings raised at Claredon Hills is one very bright and beautiful variety well adapted for bedding. It is dwarf, and though the flowers are small, the spikes are large and even, and last for a long time—a very good recommendation. It has never been named, and Mr. Macdonald, the foreman, said it had not been kept because it was thought to be any better than Crozy, but because it was different, and just as effective as a bedder.

Among yellow varieties of recent introduction it is hard to say which is at the head. Captain Suzzoni has large round-petaled flowers, spotted with reddish brown, but does not carry either so large or handsome a spike as Florence Vaughan, the flowers of which are more densely and darkly spotted. Following this is Mrs. Cowing, raised by A. H. Fewkes, of Newton Highlands, Massachusetts, and recently decorated with a silver medal by the Massachusetts Horticultural Society. This carries an elegant spike of carmine spotted flowers, each standing out well and evenly, and giving a certain fullness of aspect often lacking in others.

Monsieur Crozy's introductions for 1895 will include the grand yellow Madame Montifiore, which is a very strong grower. The spikes are large, erect and open. In general form and color it resembles Captain Suzzoni, and may be described as a great improvement on that variety. I could not help observing how well Admiral Courbet, a fine canary-yellow bedder introduced several years ago, holds its own among the newer introductions.

While visiting among the growers I found every one in love with J. D. Cabos, the comparatively new bronze-leaved variety with salmon flowers. Admiral Aurellan, one of Crozy's for 1895, is several points ahead of this. The flowers, on comparison, are larger and more regular in outline. Ingegnoile Fratelli is another handsome dark-leaved variety with buff-colored flowers. General de Miribel is salmon, with green foliage, and Secretary Nicholas clear brick-red. Charles Henderson, so far as seen, has not come up to general expectation. The spike is open, regular and erect, and the flowers, though not extra large, are a very bright crimson. The general opinion is that it does not come up to Alphonse Bouvier. What was once considered a defect in this is now considered a recommendation by many. The hanging spike, when half open, is succeeded by a secondary one just above it, and considerably enhancing its effective value. As far as I have seen, there is nothing new in the way of Paul Marquant. Its dwarf, erect habit and full spikes of satiny, salmon-red flowers should recommend it to all, and especially for winter blooming. Paul Bruant has extra-large vermilion-colored flowers, but they do not hold well, so that there are never many open at one time. Egandale is promising, and apparently is better as a foliage-plant than President Carnot. To the many admirers of this lovely variety it will appear to be saying a good deal.

François Crozy is a new green-leaved, salmon-tinted variety, of which much was expected. It does not seem to hold its color well. As the first flowers to open were very fine in tone, I should like to hear from growers whether this color defect is likely to be characteristic.

Speaking about raising Cannas from seed, Mr. Macdonald showed me a lot of self-sown seedlings scattered where the bed had been last year, and particularly where a bunch of fifty or so came up together on a spot where he had dropped a handful of seed the previous autumn. From this one may conclude that Canna seeds sown in a cold frame in the autumn will come up the following spring.

Wellesley, Mass. *T. D. Hatfield.*

Violet Notes.—August is a critical month with Violets, for it is now that the dreaded "spot" makes the greatest headway. Some growers affirm that the disease is started at this season by the hot sun glare on the plants while the leaves are wet with dew, and they contend that if the sunshine is kept from them until the foliage is dry that the "spot" can be warded off. In my experience, however, plants have been quite as badly diseased when grown where the early morning sun did not strike them as those in the sunniest location possible. Until this time our plants are clean, with the exception of some old roots of the Cape Cod or Double Russian variety, wintered in the open. It is too soon to be confident, however, and a few days may bring quite a change. We make a point of looking over our stock at least twice a week for signs of disease. All spotted leaves should be picked off, and badly

affected plants pulled up and burned. This season has been so extremely dry that we have found it necessary to water the plants on several occasions. Plants dry at the root are, I believe, more liable to disease than those kept moist and growing. Swanley White spotted very badly here last year, but so far this season it is perfectly clean, and so also is Lady Hume Campbell. Plants that are being grown along in the frames where they are to bloom should not be kept too much shaded; after three o'clock in the afternoon the sun may be allowed to shine on them. A thorough soaking of water twice a week will keep them growing satisfactorily. Runners will be forming on all plants now, and these should be cut off about every ten days, as they weaken the crowns if they are allowed to run freely. Plants should be lifted from the open from the beginning to the middle of September. Manure and compost for them may be put into the frames at any time now, and this will save some of the rush when the time for planting arrives.

Carnations.—Carnation-plants grown for summer blooming out-of-doors require regular watering or the flowers will be small. A soaking of moderately strong liquid manure, after a wetting with clear water, once a week proves beneficial. Fading flowers should be picked off, both on account of appearance and for the welfare of the plants. Straggling shoots need tying in occasionally, as flowers near the ground are likely to be ruined in a heavy shower. Among pink varieties now being tested as summer bloomers, William Scott and Nicholson are flowering freely. Plants for winter blooming have made excellent growth this season, the hot dry summer having evidently suited them. The next few weeks will be a season of vigorous growth for them, and they will need looking over once a week and topping. Some varieties, as Mrs. Fisher, Hector and Ferdinand Mangold, have a marked tendency to produce flowering-shoots at this season. Just when topping should be discontinued depends on the variety of the plant and how soon flowers are desired indoors. As out-of-door Carnations, under favorable conditions, may be had until the middle of October, indoor plants need not be brought into flower before that time. The compost for the beds or benches should be turned over, and if cow-manure has been mixed in it a sharp lookout must be kept for the larvæ of the common May beetle, the white grub and muck-worm, as it is better known. The larger grubs may easily be hand-picked and killed when the compost is being turned, and if it is carefully examined again when carried into the benches the bulk of these pests may be destroyed. Steaming or heating the soil in some other way seems to be the only effectual way to entirely kill them. When Carnations are sickly, it is owing, in many cases, to these grubs eating the bark from the stem below the surface of the soil, and also to their gnawing the roots through. A writer in a contemporary journal states that the pest may be destroyed by washing diluted kerosene emulsion with plenty of water into the compost, but not having tried this method I am unable to speak as to its efficacy.

Taunton, Mass. *W. N. Craig.*

The Quince Rust.—The station has lately received specimens of Quinces, from different parts of the state, affected with the rust, which shows itself in bright orange patches on the fruit or leaves. The rust is caused by a fungus, Roestelia pyrata, which also attacks the Apple. The fungus spends part of its life on the Red Cedar and causes what are familiarly known as "Cedar apples," which attain their growth and germinate in April and May. The spores from the Cedar-apple stage pass to the Apple or Quince, where they germinate and cause the bright orange rust on the young fruit or leaves, rendering the fruit worthless. In some cases the disease is sufficiently serious to cause defoliation of the tree, but this severity is not common. Bordeaux mixture, applied as soon as the first leaves appear, is used to check the fungus. It is also recommended to remove all Red Cedar trees in the vicinity of an orchard.

Cornell University. *G. Harold Powell.*

Correspondence.

A Border of Herbaceous Perennials.

To the Editor of GARDEN AND FOREST:

Sir,—Many of us find a great fascination in a perennial garden, and an interest renewed every spring as our old friends re-appear to greet us, creating a sentiment that cannot be gained by the use of annuals, and still less by the familiar beds of Geraniums. Nothing seems easier in theory than to make a good border, with no bare spaces, at any season, a constant succession of bloom, and with all our colors in perfect harmony. Unfortunately, in practice, the difficulties and disappointments are many. Some of these difficulties could be avoided by a more careful description in the nurserymen's catalogues; but the virtues alone are usually recorded in such descriptions, and we are left to discover by experience the faults or peculiarities of each flower.

The creation of a new garden brings surprise after surprise. In early spring we find large spaces that remain obstinately bare; later more bare spaces occur, even more hideous, where the week before it had been a blaze of color; some flowers that were so fine the first year have grown coarse and rank the second, and so on through the year our disappointments are endless.

Now, in our catalogues we find no explanation of our troubles; no mention is made of any of these peculiarities. Much information can be found in Robinson's *English Flower Garden;* but, unfortunately, it contains advice for a climate radically different from ours, and I have looked in vain among American books for any advice of value in forming a perennial garden.

It would seem as if much good could be accomplished by a series of articles on the subject, comprising, first, general advice as to the arrangement and grouping of spring and autumn bloomers, the advisability of massing many plants of the same kind, possibly giving some good combinations of color among plants that bloom simultaneously, and the like.

After this a short catalogue of the best-known flowers might follow. With each flower the ordinary florist's description of height, general habit, time of blooming could be given; to be followed by the more valuable information that we can find nowhere—whether it comes up early in the spring or not; if it dies down after blooming or retains its foliage throughout the entire season; whether it grows coarse and unfit for the garden in a year or two, or improves with age. In other words, a description of its habit and peculiarities that would enable us to place it intelligently in our garden.

I am aware that I am proposing a somewhat long series of articles, but there still remain many weeks before another spring, and I feel sure that they would be read with great interest. At present our sources of information are scanty and meagre, and I hope that GARDEN AND FOREST will come to our aid and furnish us more information on a subject that interests so many of its readers, either in the form suggested above or in some other better way.

Boston, Mass. *H. S. H.*

Chrysanthemums for Exhibitions.

To the Editor of GARDEN AND FOREST:

Sir,—After the Chrysanthemum-shows are over, one invariably sees in the gardening papers letters on the subject of judging. Often they are from dissatisfied competitors. Some good points, however, are occasionally made, and one can easily see that the system of judging is not all that it should be. There is never a year but some changes are made in the schedules, and there can be no doubt the committees honestly desire to make the work of the judges easier.

During recent years in this country we have passed almost altogether from exhibits of chrysanthemums on boards to long stems in vases, with foliage. To a great many persons it is doubtful whether one extreme is not as bad as the other. The long stiff stems with foliage has nearly shut out all but the coarser Japanese varieties. Raisers of new varieties are every year compelled to discard many fine flowers, often superb in form and color, solely on account of a weakness in the stem. Trade discrimination is in a great measure the cause of this. Florists now almost wholly decide what a flower shall be. Standard colors rule, clear and decided, with stiff stems and good lasting qualities, and any flower lacking these qualifications gets no recognition. Many of my gardening friends, failing to see beauty in these formal exhibits, think great improvement may be made by the introduction of more artistically arranged vases of flowers, with varying lengths of stem, some bending and others standing out at various angles. And again, the foliage prerequisite shuts out many excellent varieties which can only be grown on a crown-bud, and the result will undoubtedly be that these in course of time will be discarded.

Size being now almost the only criterion, the compact form and regular outline of the incurved Chinese is seldom seen; at least, on this side of the Atlantic. This is much to be regretted. So, too, with the Anemone-flowered and the Pompones. It is to be hoped, when the limit in size is reached, that more attention will be given to the neater and more refined forms. Something might be done at the forthcoming

meeting of the Society of American Florists toward broadening the scope and methods of judging, so as to include the refined and artistic as well as the majestic types. With regard to the judging of seedlings there should be a national committee, to meet three times during the season at some central city like Buffalo, and pass upon all new varieties. It should be representative, including florists, both growers and retailers, together with professional and amateur gardeners.

Wellesley, Mass. *T. D. Hatfield.*

The Forest.

Mixed Oak and Beech Forests of the Spessart: Management by the Bavarian Government.—V.

CONCLUSION.

YOUR readers may justly ask whether the income realized from these forest-lands justifies the enormous care and pains which are bestowed upon their management. The net annual money return from that range which of late years has paid best, Rothenbuch, has been about four and a half dollars an acre. This represents the money value of the timber cut in the compartments where cuttings are going on, of thinnings in other compartments, and of other sources of income minus the outlay incurred on the working and management of the entire range. This low figure may appear disappointing, and the remark will doubtless suggest itself to some of your readers, whether it would not be more profitable to sell the standing timber of the entire forest and to invest the money in Government securities. Certainly, if it were possible to sell the entire growing stock at existing rates, the interest on the money realized would exceed the net income at present derived from the forests. But, as a fact, it would not be possible to effect the sale of such large quantities at existing rates. To prevent the glutting of the market and a great fall of prices it would be necessary to spread cuttings and sales over a very long period, and if this were done it would be more economical not to destroy the forest, but to continue its management so as to insure its regeneration. The above proposition, if reduced to a practical shape, would amount to a shorter length of rotation. Instead of allowing the Oak to attain a mean age of 300 years, younger trees would be cut. That, however, would not answer at all, it would not satisfy the lumber trade which demands large timber and pays a high price for it. Prices would fall, and this would upset the data upon which the calculation was based.

Coniferous woods, it has been explained above, grow more rapidly, and consequently the rotation is shorter, the capital value locked up in the growing stock does not accumulate to the same extent as is the case in the Oak-woods of the Spessart. Hence the rent which the forest produces is higher and the capital value of land with the growing stock upon it realizes the same interest, while maintained and managed as forest, as it would, were land and growing stock sold and the amount invested in three per cent. consols. The state forests of the Kingdom of Saxony are all managed on short rotations. A large area is stocked with pure Spruce-forests, and many of these forest-ranges yield a net money return of nine dollars an acre and more, which, in the case of some, amounts to four per cent. on the capital engaged (land and growing stock).

That the existing system is not financially unreasonable is proved by the fact that large forest-areas in the Spessart, which belong to private proprietors, are managed on principles similar to those which regulate the working of the forests belonging to the state. The existing system supplies the market with the wood and timber required for building and for other purposes and yields a moderate but certain rent per acre, which probably will increase considerably, for the Slavonian forests, which at the present time send large quantities of heavy lumber to the saw-mills at the foot of the Spessart, are not all managed on the same conservative principles as the Spessart, so that sooner or later that source of supply will run dry.

Nevertheless, your readers may be right in thinking that an annual rent of four and a half dollars an acre would not satisfy forest-proprietors in America. The forests of the United States, however, have advantages which ours do not possess. From all accounts it seems certain that some of the most important forest-trees of North America—the Yellow Poplar of the Alleghanies, the Sugar Maple, the White Pine, the Redwood of California and the Douglas Fir of Oregon and Washington—grow much more rapidly than most of the forest-trees of Germany. And what is known of their regeneration by self-sown seedlings seems to show that, in many respects, the task of the forester in the United States will be easier than it is in the Oak-forests of the Spessart. And the most important point is that, with the rapid growth of population and wealth in the United States, a steady and considerable rise in timber prices may be regarded as certain. Success, however, in this business is impossible unless the principal forest-trees of North America are studied from a practical point of view in the same manner as the forest-trees of Germany have been studied. That the Sugar Maple demands shelter when young; that it, therefore, probably belongs to the same class of trees, in regard to light and shade, as the Beech and the Silver Fir, we have learned from Professor Sargent's *Silva of North America.* The forester will have to utilize such data concerning American trees, and he will have to complete them by his own observation in the forest; he must test them by practical experience and apply them in the treatment of his woods.

It is a common saying in Europe that in the United States the dollar reigns supreme. As a proof, however, that this statement is unjust, we need only invite attention to the enthusiasm and the disinterested devotion with which many branches of abstract science are cultivated in the United States. Let the foresters of America study the growth and varied requirements of their principal forest-trees with the same enthusiasm and devotion which distinguish American men of science, and the success will not be wanting. And forest-proprietors who will consent to apply the result of such studies in the management of their forest-estates will derive substantial advantages in the shape of increasing rents and a steadily growing capital value of their estates. Somebody, indeed, must set the example, and it will take some time before that example is followed by others. That example should, if possible, be set in forests, the management of which promises to be successful not only from a professional, but also from a financial point of view.

Some of your readers may hold that in America the profession of forestry ought to be built up entirely upon an American basis, and ought not to be based upon experience gained in Germany or France. Surely such national pride is an honorable feeling. In this case, however, it would lead to endless waste of time and to much disappointment. Forest-management is based upon very plain and simple principles, but it is a singularly difficult business. Excellent theories have proved quite impracticable. Actual experience is the only safe guide. Hence it is better to learn from actual experience in those countries in which the profession of the forester has attained its highest development. It would be waste of time not to utilize the lessons taught by success and failure which foresters have learned in other countries. It would have been easy, and it would have taken up much less space, if the plain and simple principles on which the treatment of mixed woods of Oak and Beech is based had been set forth in brief and precise language. Instead of this, it has been explained in detail how the present management of the mixed forests in the Spessart has come about. My object in venturing to attempt this has been to induce American foresters to come and see for themselves.

If this statement serves as a guide to some who will afterward apply what they have seen in managing the forests of their own country, the object which the author had in view will have been attained. Forest-management

in British India has been based upon forestry as it had developed in France and Germany, and it is not unreasonable to suppose that good forest-management in America will be built up upon the same foundation.

Bonn, Germany. *Dietrich Brandis.*

Meetings of Societies.

Agricultural Science in Brooklyn.

THE Society for the Promotion of Agricultural Science held its fifteenth annual meeting in Brooklyn last week, at which Professor William Saunders, Director of the Experiment Station System of the Dominion of Canada, was re-elected President, and Professor William Frear, of the Pennsylvania State College, was re-elected Secretary. Dr. Wiley, Chief Chemist of the Department of Agriculture, is associated with these gentlemen as the third member of the Executive Committee. The following are brief notes of some of the more interesting papers which were read at the sessions of the society:

Professor John B. Smith, of New Brunswick, New Jersey, read a paper on "Nurseries as Factors in the Distribution of Insect Pests," and after showing how complicated the business of fruit-growing had become, he explained that nurserymen were compelled to search the world over in order to secure varieties suited to different locations and different markets, and to find trees which are proof against blight and insects. The last thing that occurs to an exporter or importer of trees is an examination to ascertain whether they are free from insects, and in this way many destructive and troublesome species have been introduced into the United States by nurseries, and have been distributed from one part of the country to the other. As an example of this, Professor Smith said that in their search for curculio-proof Plums, two New Jersey nurseries obtained some eight or nine years ago some Japanese varieties from California, and also some Idaho Pears from another Pacific coast nursery. Both the Plums and Pears were infested by the San Jose scale, Aspidiotus perniciosus, and they multiplied unchecked in their new surroundings. Plums and Pears were grafted and budded from this stock, and the insects were propagated as well. Trees left to grow and bear were speedily overrun and served as distributing centres, infecting the nursery stock sent out to customers, and in less than half a dozen years this scale has been spread, principally by two nurseries, over the entire eastern United States from New York to Florida. Plant diseases are even more generally spread by nurseries than insects, and in the discussion of this paper it appeared that the Peach-yellows and the leaf-curl of the Peach were both disseminated in this way. There would be little difficulty in preventing the distribution of insects by nurseries on trees under proper supervision. It would be more difficult to arrest the spread of plant diseases, but it would seem that it might be a legitimate duty of experiment stations or of other institutions to look after this matter.

Professor B. T. Galloway, of the Department of Agriculture, read a paper on "The Growth of Lettuce as affected by the Physical Properties of the Soil." An especially good quality of Lettuce is forced in the greenhouses about Boston, where a strain with uniform, compact heads, yellowish white within, and light yellowish green without, free from rot or burn, is produced. Of course, in order to grow perfect plants, there must be a proper degree of light and of heat, pure seed and general skill; but, after all, an essential factor is the physical properties of the soil. First-class Lettuce cannot be grown under any conditions unless the soil has certain physical properties, which, together with the relation of the soil to circulation of air, moisture and heat, control the development of the crop. This paper was the result of some investigations into these properties of the soil, and it was an attempt to point out some of the differences between a soil that will grow good Lettuce and one that will not. The soil in which the best Lettuce grows—that is, Lettuce of the type found about Boston and Providence, where two hundred acres of specially constructed greenhouses are used in forcing this plant—was here described and a mechanical analysis given. On comparing it with gneiss-soil of Maryland it was shown that the Boston soil contained but 3.10 per cent. of clay, while Maryland soil contained 28.82 per cent. The Boston soil contained 14.59 of silt, and the Maryland 34.92. Although the Boston soil may be called sandy, its capacity for moisture is remarkable, as was shown in a graphic illustration, which gave the daily moisture-content for Boston and for Maryland soils in March, 1894, the first averaging twenty-eight per cent. of water, and the latter sixteen and a half per cent. Again, the Boston soil contains more air, as was shown by an actual determination of the empty space, and as was evidenced by the development of the roots. Professor Galloway went on to detail some interesting experiments with prepared soils, one with a mixture of two parts of drift-sand and one of greenhouse-soil, another of greenhouse-soil alone, and the third with Boston soil and decomposed manure. Without going into figures, it is enough to say that the bed of drift-sand and greenhouse-soil and the bed of Boston soil both gave results much superior to those obtained from the second bed. Altogether, a most interesting field of research was opened by this discussion and the publication of Professor Galloway's paper, with its illustrations and tables, will be welcomed by every one interested in scientific agriculture.

Professor Beal read some notes on the "Vitality of Seeds Buried in the Soil." Fifteen years ago he had buried twenty lots of fifty seeds each of twenty-one species, mostly weeds, the seeds being mixed with damp sand and placed in eight-ounce bottles. After the end of five years, and again at the end of ten years, these seeds were tested, and now at the end of fifteen years an additional test has been made which shows that many of the seeds still retain their vitality. They were sowed this spring and are still coming up. The seeds of some weeds belonging to the Mustard family, like Shepherd's Purse and Pepper Grass, all retain their germinative power, while those of May Weed (Anthemis Cotula), Evening Primrose, Purslane, Narrow Dock and Mullein are still very much alive.

In another paper on the "Vitality of Clover Seed," Dr. Beal stated that some twelve years ago he selected from a second crop of Red Clover the seeds of fifty good heads from five plants, which were placed in a glass bottle and exposed to the light. On the first of June of this year fifty seeds of each lot were tested, and a month later a second lot was tested, which showed that an average of thirty-six per cent. germinated. As a practical matter farmers may, therefore, rest assured that if their Clover-seed is well cured and kept free from insects and vermin there is little danger but that it will germinate for at least five years.

Professor W. E. Stone, of Purdue University, gave an account of some investigations of the oil of the Black Walnut, from which it appears that the actual amount of oil contained in this nut is fifty-five per cent. of the weight of the kernel. The oil extracted by pressure was a pale straw-color, with a faint but agreeable taste and odor characteristic of the nut, and after standing six months the sample remains free from unpleasant taste and smell. The oil belongs to the class of "drying oils," and a sample exposed to the air some days steadily increased in weight and became hard and varnish-like, a property also characteristic of the oil of the English Walnut. One of the valuable properties of the oil of the English Walnut is its adaptation to the manufacture of an exceptionally fine varnish. So far as can be ascertained short of a practical test, our Black Walnut oil possesses all the qualities for a similar application, and undoubtedly is capable of many practical uses if occasion demands.

Professor L. R. Jones gave a new method of combating the minute flea-beetle, which is very often destructive to the Potato crop, since these insects appear suddenly and in great numbers, and in a few days completely skeletonize the leaves of the plants. In spraying with the Bordeaux mixture, to prevent the Potato-blight, it was found that the mixture was quite as effective against these insects as against the spores of fungi.

Professor E. V. Voorhis gave an account of some experiments with Crimson Clover in New Jersey which go to prove that this is an admirable crop to sow in orchards, where it helps to increase the nitrogen supply, and can be plowed under, or may be allowed to stand and reseed the ground, acting meanwhile as a protective mulch.

Dr. Veranus A. Moore, of the United States Department of Agriculture, made an inquiry into the alleged relation existing between the Burrill disease of Corn and the so-called Corn-stalk disease of cattle, with the result that he found no clinical or experimental evidence sufficient to show that the disease of Corn is responsible for the disease in animals. There are, on the contrary, many facts to support the assumption that there is no causal relation whatever existing between this malady and the so-called Corn-stalk disease of cattle.

Professor B. D. Halsted spoke of the weather in relation to injurious fungi. Professor F. H. King presented some interesting observations on the "Rate of the Percolation of Water from a System of Tile Drains." Professor L. H. Pammel, of the Iowa Agricultural College, read a paper on "Climate and

the Character of Soil as Factors in the Development of Rust." Professor C. E. Bessey gave an account of the Russian Thistle in Nebraska. Professor F. A. Gulley, of Tucson, Arizona, read a paper on Canaigre, a Rumex which grows wild in the south-west, with the result of some investigations into its value for tanning purposes. Professor H. J. Patterson, of the Maryland Agricultural Experiment Station, discussed the "Effects of Different Fertilizing Elements upon the Composition and Combustibility of Tobacco."

Notes.

It has been an unfavorable season for late-flowering annuals, but China Asters, in excellent quality, are now seen in abundance on our street flower-stands, and are taking the place of Sweet Peas, which are passing out of season.

According to an English correspondent in the *Fruit Trade Journal*, the apple crop in England will be the lightest known in years. This promises a good export market for American apples, but the crops both in the United States and in Canada are estimated to be less than a fair yield. Nearly four hundred barrels of apples have already gone forward to England from this port.

By the burning of the Knox Warehouse, in Washington, a few days ago, Professor Scribner lost his herbarium of North American Grasses, which contained, probably, the best studied and arranged collection of these plants in existence, including many types as well as a number of California species of Dr. Kellogg's collecting, which were in Professor Scribner's hands for study. The loss is an almost irreparable one.

Mr. Michael Barker, who has for the past six years been connected with the Botanic Garden in Cambridge, Massachusetts, has taken charge of the forcing house in the Cornell University Experiment Station, and will be engaged in other horticultural work there. It is proposed to give considerable attention to Chrysanthemum culture, and growers of these plants who have trouble with insects or fungi are invited to correspond with the station.

At the sale of the second part of the Pickering Lodge collection of Orchids in London last month the prices did not range as high as at the first sale, nevertheless Cattleya Mendelii Bluntii brought one hundred guineas, a magnificent specimen of Lælia crispa superba brought fifty-two guineas, Sobralia Lucasiana brought forty-six guineas, S. xantholuca alba brought forty-four guineas, Cattleya Gaskelliana alba, in flower, brought thirty-eight guineas, and so on.

There have been light showers near this city during the past fortnight, but the intense drought can hardly be said to be broken. The trees in the parks have some of them begun to shed their foliage, and of course unhealthy and old trees and those standing in exceptionally dry places are affected the most. Of the larger kinds, however, only three show any general tendency to drop their leaves, namely, the English Elm, Silver Maple and European Lindens. The native forest-trees in Prospect Park are remarkable for their freshness and healthy color under these trying conditions.

Edward L. Rand, of Cambridge, Massachusetts, and John H. Redfield, Curator of the Botanical Department of the Philadelphia Academy of Natural Science, have just issued "A Preliminary Catalogue of the Plants growing on Mount Desert and the Adjacent Islands," to which a geological introduction, by William Morris Davis, and a new map of the island are added. The flora of Mount Desert, as here enumerated, contains 680 species with seventy-one varieties of flowering plants in 312 genera, and 606 species with 133 varieties of Cryptogamia in 215 genera, or a total of 1,286 species and 527 genera. In matters of nomenclature the authors have followed the last edition of Gray's *Manual of the Botany of the Northern States*.

In the current number of the *Orchid Review* it is stated that many English cultivators of Orchids are now using Polypodium-fibre as a substitute for peat. It has been largely used on the Continent with Odontoglossums and Oncidiums, and English growers find that Cattleyas and Lælias grown in this fibre show an improvement over those potted in peat and grown under identical conditions. The fibrous roots alone are used, all pieces of rhizome being discarded. The material is obtained from the Ardennes, where Polypodium vulgare grows in enormous quantities on the rocks and trees, from which the masses of roots are stripped and packed in bales. These are cut small with shears, then mixed with chopped sphagnum and used in the ordinary way. One advantage which this fibre offers is that it contains no fine earthy matter, so that the plants can be watered freely without the risk of the compost becoming sour, and the roots soon take possession of the whole. It will not answer for all Orchids; Dendrobiums, for example, are said to show no improvement with it, while Cypripediums fail when placed in it, as might be expected, since they are terrestrial, and prefer good fibrous loam to peat.

It is now possible to get Florida oranges in New York all the year through since growers have been developing varieties which fruit very early and others which fruit very late. Some which have been held in cold storage are now selling at seventy-five cents a dozen on the fruit-stands, and while not quite as juicy as in winter are still of good flavor. Rodi oranges, the summer Mediterranean fruit, command thirty to fifty cents a dozen. Along with these, Jamaica oranges will soon be offered, the first shipments of which have arrived here green and are being ripened up for market. Limes are in considerable demand at fifteen cents a dozen. Moore's Early, Niagara and Delaware grapes of good quality and attractive appearance are now coming from this state. These bring from fifteen to twenty-five cents a pound at retail. Princess Anne cherries, from California, were seen on our fruit-stands until within a week past. The last blackberries, small and dry, sell slowly at ten cents a quart, while huckleberries, more plentiful and in better condition, bring thirteen cents a quart. Orange Pippins, Maiden Blush, Keswick Codlins and the firmer Coxsackie Pippins are already being shipped to England, 165 barrels having been forwarded last week.

Mr. Joseph Meehan writes to the *Country Gentleman* that he prefers to transplant most coniferous evergreens in August and September. Of course, evaporation from the leaves will be quite as rapid then as at any other season, but new root-fibres will form in the warm soil much more rapidly then than at any other time. The soil in midsummer resembles soil in a propagating-bed, and trees and shrubs should be treated just as cuttings are. They should be shaded, if possible, and the roots should be kept moist. The holes for the trees, in Mr. Meehan's practice, are dug to the proper depth, and good earth is put in places where the soil is poor. Fine earth is filled in about the roots and pounded to make it solid, but the roots are never bruised. When the holes are half-filled several buckets of water are poured in, until the soil becomes mushy. After the water has soaked away more soil is filled in, but the hole is not completely filled. The next day the roots are thoroughly soaked again; on the third day the filling of the holes is completed, and no more water will be required. The roots will be moist for a week, and by that time new fibres will have put forth. When a good ball of earth is retained about the roots Mr. Meehan has never found it necessary to shade the trees or to sprinkle them, but there is no doubt that shading could be practiced with advantage where it is practicable, and syringing the foliage a few times a day would certainly be a benefit.

Perhaps the demand for flowers has never been as great in all the history of commercial floriculture as it was in Paris at President Carnot's funeral. As soon as the news of the President's death reached the French capital it was almost impossible to secure flowers at any price. Common roses, which were selling at a franc a dozen the day before, advanced at once to three francs, and blooms of La France Roses, which sold before at six francs a dozen, at once brought a franc each. Other flowers rose in proportion under the immense orders received from all directions. The Emperor of Russia, for example, ordered through his Ambassador a wreath costing 8,000 francs from a leading florist in the Rue Royale. This firm could not undertake the order, having received more commissions than could be executed. Finally, another florist was secured who could furnish a wreath for 5,000 francs. All kinds of flowers were used for the wreaths, and anything that could be secured was used. The leading florists bought at once whole beds of Pansies, Marigolds, Marguerites, the entire product of Rose-borders and houses filled with flowering Orchids, and paid any price that was asked. Most of the European sovereigns sent magnificent wreaths of rare and beautiful flowers, and various societies and associations in France, as well as different cities, sent wreaths of colossal size. That from the city of Bordeaux was made of roses and white laurel, including a pomegranate velvet pillow with an inscription upon it in gold letters. This tribute was raised by a subscription which was limited to a franc for each person, and it measured more than thirty-two feet in circumference.